DOE/RL-96-0005
Revision 2

CONCEPT OF THE DOE PROCESS FOR RADIOLOGICAL, NUCLEAR, AND PROCESS SAFETY REGULATION OF THE RPP WASTE TREATMENT PLANT CONTRACTOR

U.S. Department of Energy
Office of River Protection
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Preface

As directed by Congress in Section 3139 of the *Strom Thurmond National Defense Authorization Act for Fiscal Year 1999,* the U.S. Department of Energy (DOE) established the Office of River Protection (ORP) at the Hanford Site to manage the River Protection Project (RPP), formerly known as the Tank Waste Remediation System. ORP is responsible for the safe storage, retrieval, treatment, and disposal of the high level nuclear waste stored in the 177 underground tanks at Hanford.

The initial concept for treatment and disposal of the high level wastes at Hanford was to use private industry to design, construct, and operate a Waste Treatment Plant (WTP) to process the waste. The concept was for DOE to enter into a fixed-price contract for the Contractor to build and operate a facility to treat the waste according to DOE specifications. In 1996, DOE selected two contractors to begin design of a WTP to accomplish this mission. In 1998, one of the contractors was eliminated, and design of the WTP was continued. However, in May 2000, DOE chose to terminate the privatization contract and seek new bidders under a different contract strategy. In December 2000, a team led by Bechtel National, Inc. was selected to continue design of the WTP and to subsequently build and commission the WTP.

A key element of the River Protection Project Waste Treatment Plant (RPP-WTP) is DOE regulation of safety through a specifically chartered, dedicated Office of Safety Regulation (OSR). The OSR reports directly to the ORP Manager. The regulation by the OSR is authorized by the document entitled *Policy for Radiological, Nuclear, and Process Safety Regulation of the River Protection Project Waste Treatment Plant Contractor* (DOE/RL-96-25) (referred to as the Policy) and implemented through the document entitled *Memorandum of Agreement for the Execution of Radiological, Nuclear, Process Safety Regulation of the RPP-WTP Contractor* (DOE/RL-96-26) (referred to as the MOA). These two documents provide the basis for the safety regulation of the RPP-WTP at Hanford.

The foundation of both the Policy and the MOA is that the mission of removal and immobilization of the existing large quantities of tank waste by the RPP-WTP Contractor must be accomplished safely, effectively, and efficiently.

The Policy maintains the essential elements of the regulatory program established by DOE in 1996 for the privatization contracts. The MOA clarifies the DOE organizational relationships and responsibilities for safety regulation of the RPP-WTP. The MOA provides a basis for key DOE officials to commit to teamwork in implementing the policy and achieve adequate safety of RPP-WTP activities.

The Policy, the MOA, the RPP-WTP Contract and the four documents incorporated in the Contract define the essential elements of the regulatory program being executed by the OSR. The four documents incorporated into the Contract (and also in the MOA) are as follows:

Concept of the DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor, DOE-96-0005,

DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor, DOE/RL-96-0003,

Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor, DOE/RL-96-0006, and

Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP Waste Treatment Plant Contractor, DOE/RL-96-0004.

DOE patterned its safety regulation of the RPP-WTP Contractor to be consistent with the concepts and principles of good regulation (stability, clarity, openness, efficiency, and independence) used by the Nuclear Regulatory Commission (NRC). In addition, the DOE principles of integrated safety management were built into the regulatory program for design, construction, operation, and deactivation of the facility. The regulatory program for nuclear safety permits waste treatment services to occur on a timely, predictable, and stable basis, with attention to safety consistent with that which would occur from safety regulation by an external agency. DOE established OSR as a dedicated regulatory organization to be a single point of DOE contact for nuclear safety oversight and approvals for the WTP Contractor. The OSR performs nuclear safety review, approval, inspection, and verification activities for ORP using the NRC principles of good regulation while defining how the Contractor shall implement the principles of standards-based integrated safety management.

A key feature of this regulatory process is its definition of how the standards-based integrated safety management principles are implemented to develop a necessary and sufficient set of standards and requirements for the design, construction, operation, and deactivation of the RPP-WTP facility. This process closely parallels the DOE necessary and sufficient closure process (subsequently renamed Work Smart Standards process) in DOE Policy 450.3, *Authority for the Use of the Necessary and Sufficient Process for Standards-based Environment, Safety and Health Management*, and is intended to be a DOE approved process under DOE Acquisition Regulations, DEAR 970.5204-78, *Laws, Regulations and DOE Orders,* Section (c). DOE approval of the contractor-derived standards is assigned to the OSR.

The RPP-WTP Contractor has direct responsibility for WTP safety. DOE requires the Contractor to integrate safety into work planning and execution. This integrated safety management process emphasizes that the Contractor's direct responsibility for ensuring that safety is an integral part of mission accomplishment. DOE, through its safety regulation and management program, verifies that the Contractor achieves adequate safety by complying with approved safety requirements.

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CONCEPT OF THE DOE PROCESS FOR RADIOLOGICAL, NUCLEAR, AND PROCESS SAFETY REGULATION OF THE RPP WASTE TREATMENT PLANT CONTRACTOR

1.0 CONCEPT

The basic concept of the U.S. Department of Energy's (DOE's) regulatory approach to radiological, nuclear, and process safety is that the Contractor be responsible for achieving adequate safety by (1) applying the integrated safety management process which includes following the contractually prescribed process for requirements and standards selection, (2) complying with applicable laws and regulations, and (3) conforming with top-level safety standards and principles specified by DOE. Consistent with applicable laws and legal requirements, the Contractor is required to tailor the exercise of this responsibility to the specific hazards associated with its activities. The Contractor is encouraged to exercise this responsibility in a cost-effective manner that applies best commercial practices.

DOE is including radiological, nuclear, and process safety within the River Protection Project Waste Treatment Plant (RPP-WTP) regulatory scope. Process safety - safety from hazardous chemicals that may be in the DOE-provided waste or introduced into the treatment system as chemical agents–is incorporated into DOE's regulatory scope because (1) chemical hazards are intimately bound to and co-exist with the radiological and nuclear hazards in the waste; (2) enhanced assurance of worker health and safety is important to the success of RPP-WTP program; and (3) the nuclear industry normally incorporates significant non-nuclear hazards with the evaluation of radiological and nuclear hazards, particularly if the non-nuclear hazards may affect the nature and the control of the radiological and nuclear hazards.

Incorporation of process safety into the DOE regulatory scope means that chemical hazards and their control will be (1) evaluated by the Contractor and DOE concurrently with the evaluation of the radiological and nuclear hazards, (2) included as aspects of the DOE/Contractor regulatory interactions, and (3) considered by DOE in arriving at its regulatory decisions. Incorporating process safety in the DOE regulatory scope ensures that adequate protection from radiological, nuclear, and chemical hazards is achieved in an integrated, consistent, and balanced manner. While this incorporation enhances the execution of DOE's responsibilities for ensuring adequate safety, it in no way relieves the Contractor from any obligation to comply with occupational safety and health regulations.

2.0 REGULATORY FRAMEWORK FOR RADIOLOGICAL, NUCLEAR, AND PROCESS SAFETY

For safety regulation of the RPP-WTP Contractor, DOE will rely substantially on its nuclear safety rules (10 CFR 820, "Procedural Rules for DOE Nuclear Activities"; 10 CFR 830, "Nuclear Safety Management"; and 10 CFR 835, "Occupational Radiation Protection") and on the application of fundamental principles of radiological, nuclear, and process safety. DOE will

draw heavily upon the concepts and principles established from the experiences of the commercial nuclear community, including the reactor sector, and the chemical industry.

To facilitate definitive, decisive, and timely regulatory decisions and actions, two basic activities must be accomplished. The first, which is a responsibility of the Contractor, is to identify and recommend to DOE the set of standards and requirements necessary to ensure safety. The second, which is a responsibility of DOE, is to execute the DOE-established regulatory process. This process will result in authorizations of Contractor actions (start of construction, start of waste processing operations, and start of deactivation) and confirmation that the Contractor's activities are performed safely and within approved limits.

The DOE regulatory approach requires that the Contractor take an active and significant role in identifying and recommending the standards and requirements it will use to achieve adequate safety for its specific activities. These standards and requirements shall include applicable legal requirements and shall conform to a set of DOE-specified top-level standards and principles for effective radiological, nuclear, and process safety. The top-level standards include the radiation exposure limits for the general public, co-located workers, and workers in the facility. The top-level principles provide proven practices for the control of radiological, nuclear, and chemical hazards. The top-level radiological and nuclear principles have been drawn from pertinent sources, including publications by the International Atomic Energy Agency and the U.S. Nuclear Regulatory Commission. The top-level process safety principles, addressing hazardous chemicals, have been drawn from pertinent sources, including publications of the Center for Chemical Process Safety of the American Institute of Chemical Engineers and the Occupational Safety and Health Administration. These top-level safety standards and principles are presented in DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*.

DOE requires that the Contractor follow a DOE-specified, structured process to identify the set of subordinate standards and requirements, that when properly implemented provide adequate safety by applying the integrated safety management process which includes the contractually prescribed process for requirements and standards selection; complies with applicable laws and regulations; and conforms to the top-level safety standards and principles specified by DOE. Consistent with meeting legal requirements, the Contractor will have significant responsibility and flexibility for identifying its standards and requirements within the context of (1) the Contractor's specific technology and processes, (2) the work to be performed, (3) the character and magnitude of the radiological, nuclear, and chemical hazards involved, and (4) the selected means of mitigating the hazards. In its set of standards and requirements, the Contractor must include the applicable DOE nuclear safety regulations in 10 CFR 820, 10 CFR 830, and 10 CFR 835. The structured process to be used by the Contractor for identifying and recommending the set of standards and requirements is contained in DOE/RL-96-0004, *Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP Waste Treatment Plant Contractor*. DOE will review and approve the Contractor's recommended set which when approved, will become the Safety Requirements Document. Compliance with the Safety Requirements Document will become a requirement of the Contract.

DOE will formally review and authorize the construction and operation of the RPP-WTP facility to process radioactive waste. This formal regulatory process will require definitive, decisive, and timely actions on the parts of both the Contractor and DOE to ensure safety while complying

with the schedule of the *Tri-Party Agreement*. DOE will prepare the appropriate guidance documents covering the deliverables identified in Standard 7 of the Contract. The Contract document that outlines this process is DOE/RL-96-0003, *DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor.*

DOE's safety regulation process will provide for continuing regulatory oversight and for enforcement action when necessary.

3.0 REFERENCES

10 CFR 820, "Procedural Rules for DOE Nuclear Activities," *Code of Federal Regulations*, as amended.

10 CFR 830, "Nuclear Safety Management," *Code of Federal Regulations*, as amended.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

DOE/RL-96-0003, *DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor*, Rev. 2, U.S. Department of Energy, Office of River Protection, 2001.

DOE/RL-96-0004, *Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP Waste Treatment Plant Contractor*, Rev. 2, U.S. Department of Energy, Office of River Protection, 2001.

DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*, Rev. 2, U.S. Department of Energy, Office of River Protection, 2001.

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, 1996.

4.0 LIST OF TERMS

DOE	U.S. Department of Energy
RPP-WTP	River Protection Project Waste Treatment Plant

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